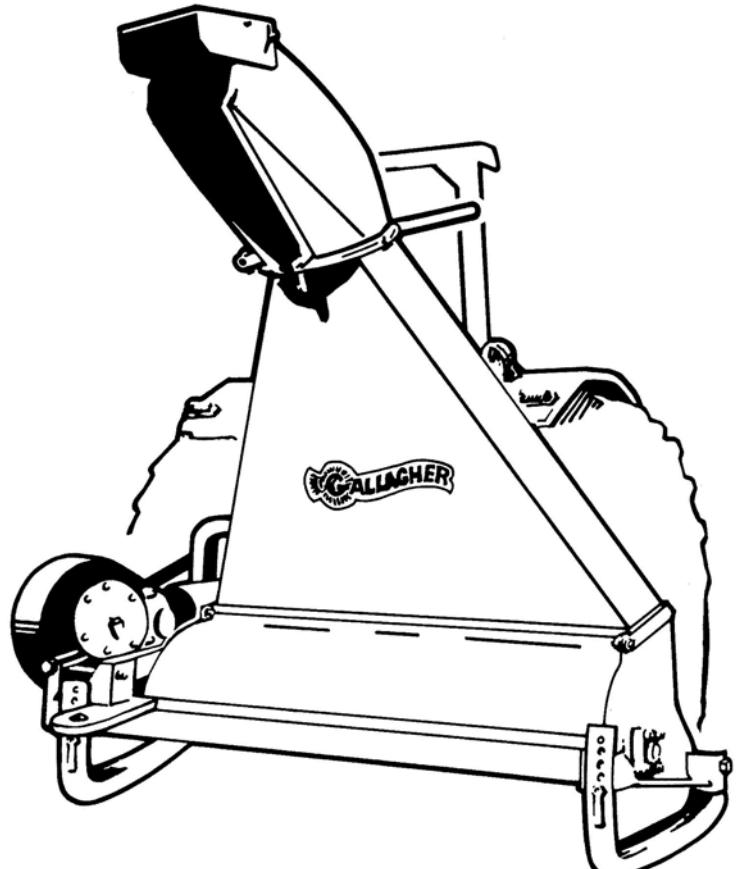




Gallagher 1.35m & 1.85m Forage Harvester

Operator's Manual & Parts Book



Giltrap Engineering Ltd
P.O. Box 83
7 Main North Rd
Otorohanga, New Zealand
Phone: +64 7 873 7199
Fax: +64 7 873 8131
Email: info@giltrapeng.co.nz
Website: www.giltrapag.co.nz



Disclaimer

Although every endeavour has been made to compile as near to complete records as possible for the machine described, it is possible some information is incomplete or missing.

Giltrap Engineering request that you treat this book as a guide only, and offer any assistance necessary to procure the information or part you may require.

For parts or service enquires, please contact the applicable numbers on the previous page.

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Introduction

Thank you for purchasing a *Giltrap* product. *Giltrap Engineering Ltd* has enjoyed a long-standing success with their machinery. We would like you to enjoy the benefits of owning a *Giltrap* too. By following the guidelines laid out in this book, you will ensure trouble free, low maintenance operating for years.

Giltrap Engineering Ltd is a progressive company which continually strives to satisfy your needs, so we welcome any feedback which you can provide to help us improve our products and services and to ensure that they perform to your expectations. Any constructive comments about this operator's manual are also welcome.

Your machine has been designed to perform its task efficiently and with a minimum of maintenance. This handbook provides safety guidelines, instructions, maintenance requirements and parts listings. We recommend that you read the entire handbook, before operating the machine as this will enable you to take full advantage of your new machine's considerable potential.

Delivery

Before you begin to use your machine, please check it to make sure there is no delivery damage. If damage is evident, contact the dealer who supplied the machine so that they can make the appropriate claims.

If you have any other queries, please contact your dealer or *Giltrap Engineering Ltd* (0800 80 GILTRAP).

All *Giltrap* products are covered by a 12-month warranty on parts and labour, subject to normal use.

Please fill in the details below for future reference.

Model:

Serial No:

Delivery Date:

Dealer:

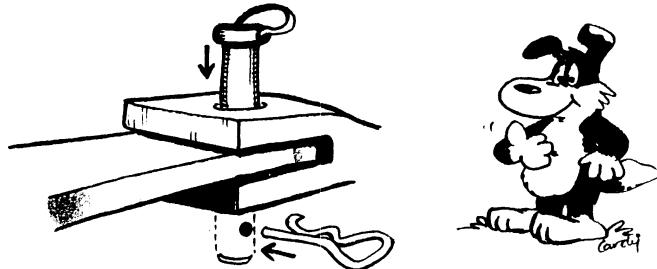
General Safety

For the safety of others and yourself, please read and follow the precautions in this operator's manual. Pay particular attention to the following safety aspects of operating machinery.

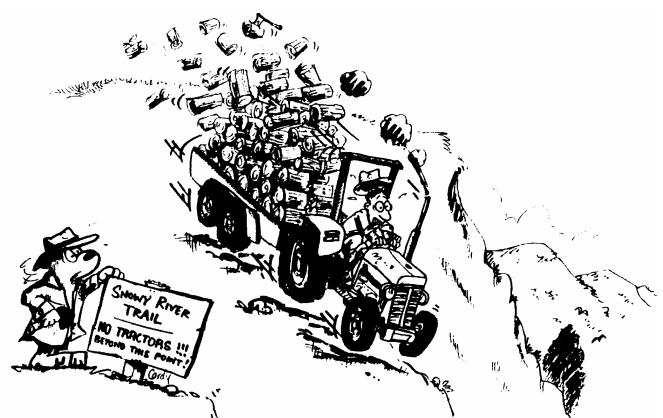
Do not ride on or allow passengers on the machine.



Always use a recognised hitch pin with a safety clip to hook trailedd implements on behind the tractor.



When pulling trailedd implements or loads, be sure to use a tractor of greater or equal weight than the combined weight of the load and trailer.

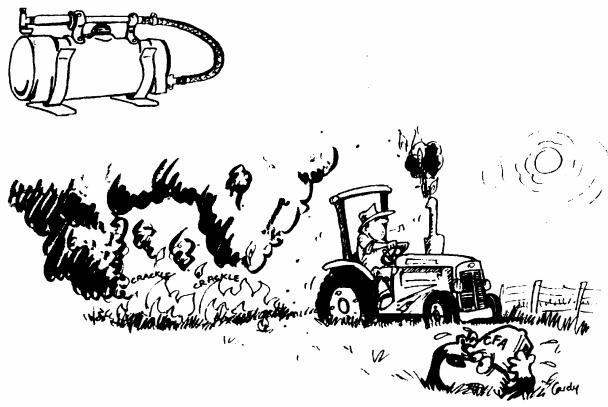


Gallagher Forage Harvester Parts & Operation Manual

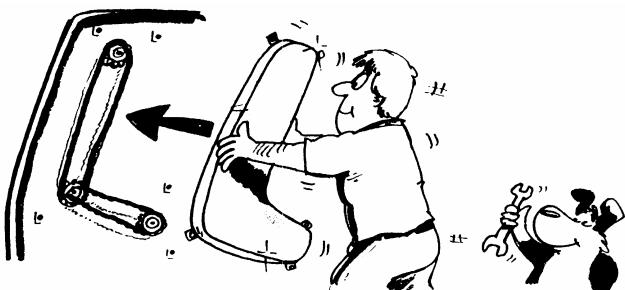
Carry a suitable fire extinguisher.

A fire can ignite under certain conditions, so please take the following precautions:

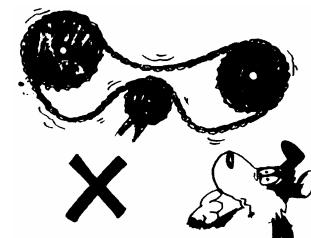
- After running your machine for a short time, check for defective bearings. A faulty bearing can become very hot, eventually discolouring, requiring immediate replacement.
- Do not allow combustible material to accumulate inside guards or around rollers and other moving parts.
- If your machine becomes blocked, stop immediately and remove the obstruction.
- Be careful when operating in hot or dry conditions or on extreme fire risk days.



Never operate your machine without the safety guards in place.



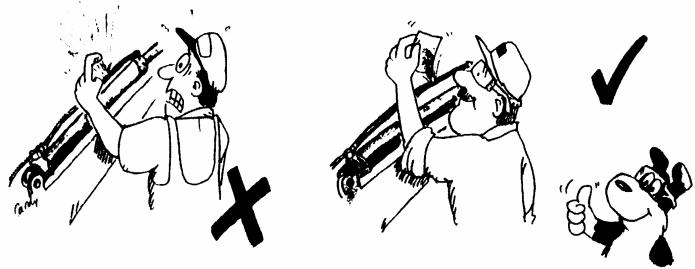
All chains and belts should be properly adjusted and replaced when necessary.



Gallagher Forage Harvester Parts & Operation Manual

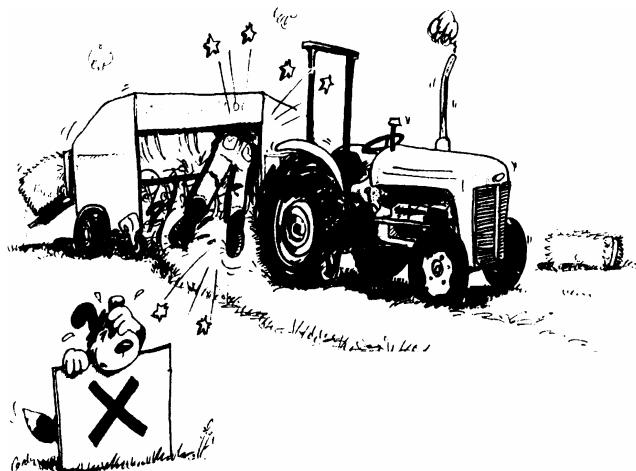
Release all hydraulic pressure from implements before commencing service work. Never look for suspected oil leaks with your hands or body - use a piece of cardboard instead.

Any fluid which penetrates the skin will have to be removed immediately by a medical expert. Seek specialist advice on this type of injury.

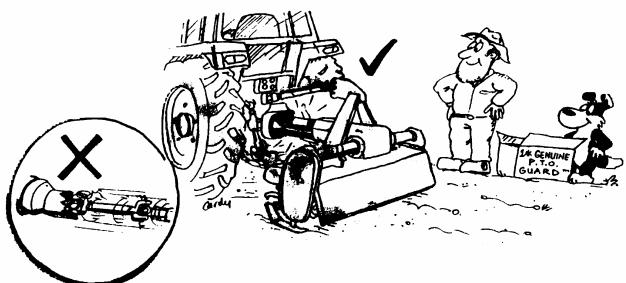


Never attempt to unblock equipment while it is still operating.

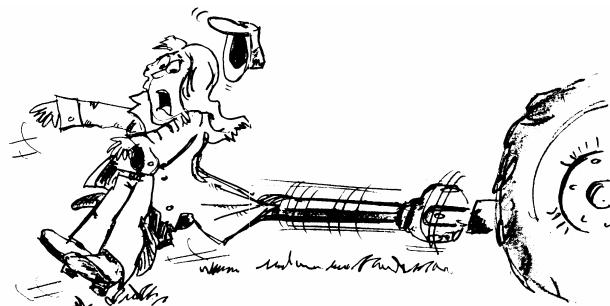
Always disengage power take-off, hydraulics and shut down engine before removing materials, checking or servicing. Failure to follow these precautions is likely to result in serious injury.



Ensure that your PTO shaft is adequately guarded. Do not attempt to use a driveshaft without a cover.



Wear proper protective clothing. Loose attire can easily be snagged by rotating machinery resulting in serious injury or death.



Warranty

The Gallagher MULTICUT and FINE CUT FORAGE HARVESTER are guaranteed to give trouble free service under normal use and maintenance. It is also guaranteed to be free from defects in materials used and workmanship for a period of 12 months or 500 working hours, whichever comes first.

The drive shaft, rotor bearings and pulleys (provided they are not permitted to work loose) are all guaranteed against excessive wear in this time.

The guarantee is to repair or replace any faulty part returned to the dealer from whom the machine was purchased, or to the manufacturer.

Claims should be made through the Dealer using official warranty claim forms provided by the manufacturer.

Note:

- Vee belts and flails are not covered by the warranty.
- The warranty does not cover accidental damage caused by transporters or operator negligence.

Warranty Restriction:

- Maximum kw input @ 540/1000 rpm = 44
- Maximum hp input @ 540/1000 rpm = 60

Important:

- Torque limiters should be fitted to drive shafts if larger tractors are used.
- Refer to page 10 for forager rotor speeds and belt sizes for manufacturer's recommendations.

Specifications

Model	1.35	1.85
Cutting width	1.37m (4' 6")	1.85m (6')
Overall width	1.70m	2.14m
Overall height without chute	0.97m	0.97m
Overall height with std. chute	2.44m	1.94m
No. of Vee belts	2	3
Max tractor PTO output	44kw (60hp)	44kw (60hp)
Number of flails (Multicut)	60	78
Number of flails (Finecut)	20	26

Note: All Multicut Foragers are fitted with 8mm spring steel flails as standard.

Mounting the Forage Harvester

1. Reverse the tractor up to the implement on level ground.
2. Attach the left linkage arm first and then the right, using the leveling attachment, if necessary.
3. Ensure that the correct category pins are used.
4. Fit the top link and adjust so that the gearbox is level when the machine is lifted just above ground level.
5. Adjust the sway bars to minimise side movement.
6. Connect the drive shaft. Check that the telescopic section does not “bottom” when the hydraulics on the tractor are lowered.
7. If the tube needs shortening, cut with a hacksaw, allowing approximately 100mm before bottoming would occur. Set the clutch to allow for minimum slippage etc (see page 14).
8. Check gearbox oil level.
9. Check rotor speed will be suitable for the tractor being used for the job in hand (see page 4).

Height Adjustment

Skids:

If direct cutting of crop is intended, the front setting for skids should be on the top hole provided in the body panel.

If picking up pre-cut and wilted material, the front setting for the skids should be on the bottom hole.

The weight of the machine should be carried on the rear half of the skids.

Rear Roller Assembly:

If soft ground or heavier than normal trailers (larger than 4 tonne loads) are encountered, it is advisable to fit an adjustable rear roller assembly (available as an accessory) which reduces scalping and conserves power.



Forager Rotor Speeds and Belt Sizes

540 RPM input = 1118 gearbox output RPM

1000 RPM input = 2070 gearbox output RPM

540 RPM		TOP PULLEY DIAMETER				
1000 RPM						
Central Mount		230mm (9")	260mm (10 1/4")	300mm (11 3/4")	325mm (12 3/4")	350mm (13 3/4")
Offset Mount		*	1273	1460	1583	1708
BOTTOM PULLEY DIAMETER	230mm (9")	*	*	*	*	*
		*	C61	C64	C65	C66
		*	C55	C56	C58	C60
		928	1118	1282	1391	1500
	260mm (10 1/4")	1817	2070	*	*	*
		C61	C63	C66	C67	C69
		C55	C56	C58	C60	C62
		856	975	1118	1213	1308
	300mm (11 3/4")	1585	1806	2070	*	*
		C64	C66	C68	C70	C72
		C56	C58	C60	C62	C64
		789	899	1030	1118	1206
	325mm (12 3/4")	1461	1664	1908	2070	*
		C65	C67	C70	C72	C74
		C58	C60	C62	C64	C66

(*) NOT RECOMMENDED

Standard Pulleys Fitted @ 540 RPM Top Pulley 300mm (11 3/4")
Bottom Pulley 260mm (10 1/4")

Standard Pulleys Fitted @ 1000 RPM Top Pulley 230mm (9")
Bottom Pulley 325mm (12 3/4")

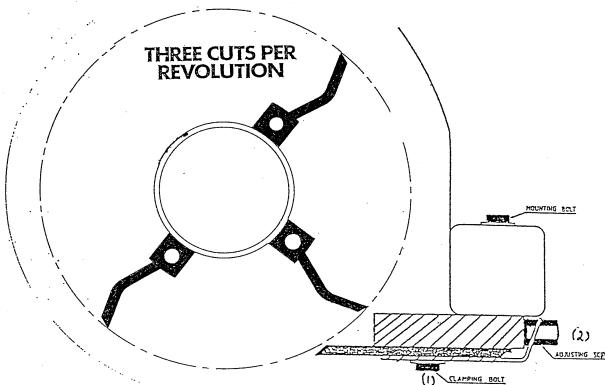
Recommended Rotor Speeds

- All types of silage and rushes 1450-1550 RPM
- Hay 1000-1600 RPM
- Conditioning 500-1000 RPM

Fitting and Adjusting the Fine Cut Bar

To obtain finecut or multicut material the correct setting of the *Fine Cut Bar* is essential.

The bar is located underneath the front beam of the forager and is secured by three bolts. The chamfer should be on the top of the bar. A forward or backward movement can be obtained by loosening the nuts and sliding the bar or tapping it with a light hammer, using a block of wood as a buffer. Slots are provided in the bar to allow for this.



The Correct Setting

1. The flail should be held in the hand and extended toward the bar. Carefully rotate the rotor just enough to ensure that the flails cutting edge is at its extreme arc as it passes the sharp cutting edge of the bar.
2. Set the bar to within 3mm of the cutting edge of the flails, checking the full width of the bar. Tighten the nuts evenly to secure.
3. Should the slots not allow this setting to be made, it will be necessary to remove the bar and elongate the slots by best means before reassembly and resetting.
4. **IMPORTANT:** Always engage the PTO drive slowly, especially after resetting the Fine Cut Bar. Listen for flails which might be slightly longer than others which may touch the bar.

Sharpening the Fine Cut Bar

The crops getting harvested and the acreage covered will determine the frequency of sharpening. Sharp cutting edges reduce horsepower consumption significantly.

Procedure:

Remove the bar from the machine. Sharpen the cutting edge with an angle grinder, taking care to maintain the same angle of chamfer and leaving the edge straight.

If the bar is too worn, replace it.

Sharpening the Flails

Spring Steel and Heavy Flails

Remove the forager chute and the removable back panel.

Without removing the flails, hold them at a convenient angle and sharpen using an angle grinder. Take care to maintain the same angle of chamfer across the cutting edge.

Spring Steel Flails – 8mm (Part # 714001)

Keep the flails to a uniform size to prevent vibration.

Replace the full set if sizes become too varied and vibration starts.

Heavy Wide Flails with Hard Facing (Part # 108058)

Use the same method of sharpening. See diagram for correct angle.

If replacements are necessary, always quote the number stamped on the back of the flail near the top welding, and also the stage of wear.

The best practice to follow is to take or send a sample to your nearest Gallagher Dealer for an assessment and identification for replacement, if necessary.

Replacing Flails

Fine Cut Flails

Flails (138mm wide, 108058 is stamped on the back with a number.) These numbers are codes, not weights. If the flails on the machine are near new, the replacement flail should match the number on the fitted flails to maintain balance and avoid vibrations. When replacing worn flails, use a flail with a lower number. The numbers start at -3 and go to 16. The flails should be greased regularly through the small hole in the centre of the hinge portion of the flail.

Multicut Flails

Spring steel flails (69mm wide, part # 714001) are available as spare parts.

Note: Fine cut flails (138mm wide) must not be used on Multicut machines.

SPECIAL NOTE - To avoid damage to the tractor and forager transmissions.

Engaging and disengaging tractor PTO shafts when the forager is mounted.

Like many other PTO driven machines, the Gallagher Forage Harvester absorbs a lot of energy when starting. The weight of the flails and the rotor can be as much as 80kgs on some models.

On most modern tractors there is a damper on the hydraulic or electric start switches as PTO shafts are engaged to cater for initial loading.

CAUTION

Some tractors do not have very effective dampers and risks of damage to PTO shafts is great unless engine revolutions are reduced to an idle before engaging or disengaging.

The problems will increase if PTO shafts are engaged at speed as the machine enters the crop, which naturally increases the load dramatically.

Severe damage can also occur when disengaging quickly, if the rotor revolutions are not allowed to come back to an idling speed, as the PTO shaft stops abruptly.

Operating Instructions

Direct Cut Harvesting

Choose a dry sunny day when the crop is in its early flowering stage, but moisture content is low.

Rotor RPM should be around 1450-1550 for good results.

The fine cut bar forward of the flails should be set as close to the extended flails as the adjustment allows – approximately 3mm.

The fine cut bar should be sharp and maintained that way by using an angle grinder whenever necessary.

The length of the cut of material will be determined by the forward gear selected in relation to the crop but if the machine is set correctly, will be between 40-150mm.

To obtain a good throw of material and avoid blockages in the chutes:

- Harvest when the crop is in its early flowering stage and approximately 250mm high.
- Maintain high rotor RPM to keep flails fully extended.
- Make sure that the machine is tilted forwards rather than backwards as the material that is thrown off the flails in a near vertical angle joins the air blast which assists it to the top of the chute.
- If the chute is lying backwards too far, the material strikes the front of the chute too soon and can fall back into the stream creating blocks. In this case, shorten the top link and lower the back of the skids.
- Wide mouth chutes do not normally block.

Pre-wilted Pasture Harvesting

Harvest as soon as moisture content has decreased to the stage when a sample wrung in the hands does not exude excess moisture. It is very important not to over-wilt, as this requires more power when a fine cut is required and is often difficult to pick up.

Do not wind-row several rows into one unless the crop is very light. Avoid lumps which tend to choke the machine and overload the transmission.

Use the same fine cut bar setting as for direct harvesting, as well as the same method to obtain good fine cut material – i.e. fast rotor speed and reduced ground speed.

If silage becomes over-wilted, lift the machine higher off the ground to increase the draught under the machine.

Lubrication and Adjustments

DAILY grease all grease points using a needle point grease gun, including rotor bearings, rear roller bearings (if a roller is fitted), drive shaft telescopic section, cross and bearings and fine cut flails.

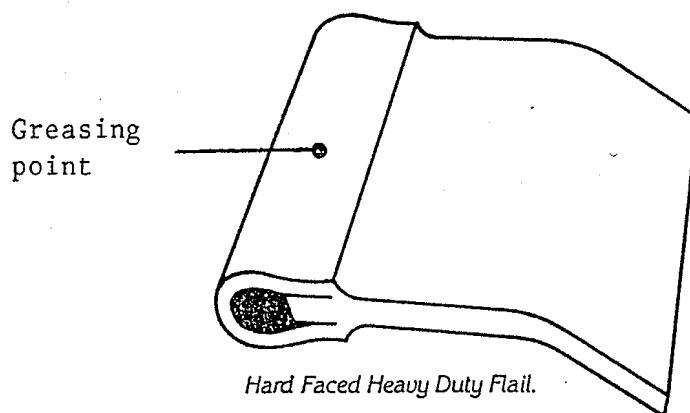
After the FIRST FIVE WORKINGS HOURS, remove the belt guard and check that the pulleys are secure. Check rotor bearings, bolts, gearbox carriage bolts and nuts. Tighten if necessary.

After FIRST FIFTY WORKING HOURS, drain gearbox and refill with a multi-grade SAE 90EP oil, and check all nuts and bolts. Gearbox oil capacity is 1 - 1.6 litres (depending on gearbox fitted).

Change oil every 800-1000 hours. Check oil level at regular intervals or immediately on signs of external breakage and refill if necessary.

To Tighten Vee Belts:

1. Remove the pulley guard.
2. Ensure that the gearbox drive shaft tube remains in a horizontal position if adjustment is made. To achieve this, slacken off the gearbox mounting bolts, and bolts securing the tube flange to the end plate. Slacken off the locknut on the adjustment screw. Wind the adjuster bolt up until the belts are at the correct tension (allow for about 5mm movement only) do not over tighten as this can overheat bearings, causing failure.
3. Tighten up all nuts and bolts and replace the pulley guard before using the machine.



Do's & Don'ts

DO'S

- Grease the machine regularly including the drive shaft.
- Clean the body following use and store in a dry place. Grease all grease points after cleaning.
- Use genuine Gallagher spare parts during maintenance.
- Keep feet and hands clear of the machine when engine is running.
- Observe recommendations of the manufacturer in regard to operation.
- Lift machine just clear of the ground when making sharp turns.
- Set the lift stop on the hydraulic controls.
- Remove hearing protection occasionally and listen for unusual noises which may indicate loose pulleys or worn bearings.
- Observe normal safety precautions.
- Select a professionally built silage trailer "slightly heavy-on" especially if towing over rough ground or over stacks. Incorrectly balanced trailers can cause forager and/or tractor front to lift.

DON'TS

- Do not scalp the ground, especially if the soil is sandy and abrasive.
- Do not neglect normal maintenance procedure.
- Do not allow inside of chutes to become rusty.
- Do not fit parts, such as flails, other than Gallagher. Use only flails of the correct weight.
- Do not allow children to ride on the tractor while harvesting.
- Do not lend your machine unless full operating instructions are given, which includes maximum kw at PTO.
- Do not lift machine too high while PTO is engaged.
- Do not engage or disengage the PTO unless tractor engine is at idle. Extreme damage could otherwise result.
- Do not use tractors with more than 44kW at the PTO unless torque limiter is effectively fitted.
- Do not neglect safety precautions.
- Do not drag unnecessarily large and heavy trailers behind the forager.
- Do not wash machine down immediately after use as metal will contract and also water will be drawn into bearings.

Troubleshooting

Trouble	Cause	Cure
Belts coming off	Pulleys out of alignment	Re-align pulleys
Body and chutes cracking	Excessive vibration from unbalanced rotor	Inspect flails and replace if missing or badly worn
	Bent rotor due to large strike or machine dropped onto protruding object	Straighten rotor if able or replace
Central main and short top chutes blocking	Crop too dry and floating	Use wide mouth chute
Consistent blocking in light crop	Machine laying back too far	Shorten top link for more vertical throw
Wide mouth chute blocking	Crop wind-rowed into too large and lumpy rows.	Lift the machine and take part of the row only.
	Fine cut bar set too wide open	Close up fine cut bar settings
Grass sticky and clinging to chute	Crop too moist and heavy	Allow more wilting time until moisture content is below oozing when wrung by hand.
Drive shaft bottoms	Drive shaft too long	Shorten drive shaft, allowing approx 100mm before bottoming will occur.
Drive shaft oscillates or comes apart when machine is lifted	Drive shaft too short	Replace tube. Cut to correct length
Machine consumes excessive power	Blunt or bent flails	Replace full set of flails
	Wrong pulley combination	Check pulley & belt chart
Rumbling noise	Worn bearing	Replace bearing before continuing

Service Manual

Each Gallagher machine leaves the factory under a Warranty covering materials used, parts and workmanship.

The adjustments provided on the machine to suit the job in hand are made by the Dealer concerned or by the owner at time of delivery.

If any of these adjustments or controls such as skids or rear rollers have been removed and the machine used without them, the manufacturer cannot accept responsibility for damage caused.

The recommended 68kW at the pto must not be exceeded unless a torque limiter is fitted.

If the vee belts are adjusted correctly some slippage will protect the transmission on both the tractor and implement.

Excessive power and overloading the capacity of the machines, can result in flails being bent back and consequently loosing their effectiveness i.e. loss of cutting ability, loss of draught and throwing capability.

The most common service work carried out on Foragers is to detect and correct vibration problems.

Vibration can be caused by several factors as listed below:

1. A missing flail.
2. Bent flails or stuck flails.
3. Unevenly worn flails.
4. Replacement flails being fitted using wrong categories (all flails are numbered for weight).
5. Bent rotors.
6. Worn bearings.
7. Loose pulleys.
8. Pulleys out of balance.
9. Driveshaft incorrectly welded or bent.
10. Gearbox problems.

NOTE:

Open-ended rotors on older models can get unevenly loaded with dirt and cause vibration. Vibration can cause a lot of damage to the body of the machine if not attended to. It should be corrected immediately.

Rotors are balanced in the factory fully fitted with flails at working speed.

The category weight of flail is used and small weights welded to the rotor tube to achieve an acceptable tolerance. When replacing one or two flails which may have been damaged, the serviceman should first identify the category number on the back of the flail.

If the flails on the machine are 'near new', the flails should be replaced with new ones of the same category.

If the flails on the machine are partly worn through the hard facing, as an example, he should select replacement flails one category number less than the original.

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Should the flails be badly worn it is good practice to replace the full set with flails all of the same number, regardless of what it is.

To fit a replacement flail

Regardless of the type of machine being worked on, the serviceman will quickly see which pins need to be drawn.

If the flail is near one end of the rotor, a hole provided in the end plate can be lined up so that a punch can be passed through or the pin can be driven out through the hole. On some occasions two or three flails will need to be removed to get to the faulty one. The pin blocks are in line and the pins will move along through them.

Factors 1-4. Worn or damaged flails

Step A. Select a parallel punch to drive out the roll pins securing the flail pin and proceed to remove the necessary roll pins.

Step B. Turn the rotor if necessary, to line up the end flail pin with the hole provided in the end plate.

Step C. Check the flail pin for being straight and that the hardening on the surface is not cracking (recent models may have high tensile pins).

Step D. Remove the flails and check for angle against a new flail. If it has been straightened, take a close look at all of the other flails.

Step E. Replace with new parts where necessary using the reverse procedure.

Step F. Ensure that the roll pins are well secured before test running.

Factor 5 - Bent Rotor

Bent rotors can be caused by mishap only.

The machine may have been dropped during transportation or at the point of delivery or during use.

An operator could inadvertently run up against a stump or some such object. Watch for excessive bearing movement in housings as a simple detection method.

To test, if it is not visible at first, the rotor should be removed and set on a pair of stands with the end bearing surfaces running in vee supports. A bent rotor will flop, banana fashion, with bend downwards. The flails are best removed.

Depending on the condition of the rotor and the extent of the damage found, will determine whether a satisfactory repair should be attempted or not.

If the damage is slight, a repair may be successful, but if the damage is too great, a new rotor would be the best solution.

Factor 6. Worn Bearings

Most farmers and servicemen can recognise the symptoms of worn bearings fairly quickly by the rumbling produced when the rotor is turned.

If correct maintenance is carried out, bearings are not a problem.

The machines are fitted with external bearings for easy maintenance and can normally be changed on the farm without special equipment.

Occasionally some end float in the rotor necessitates the fitting of a large washer and bolt to the end of the rotor shaft at the non drive end. It is necessary to drill and tap a hole into the centre of the rotor shaft. This assists the collar and Allen screws in securing the rotor which is at times under enormous torque during harvesting.

Factor 7. Loose Pulleys

Occasionally pulleys can come loose shortly after the machine has started work. It is important to check them during the first day's operation to eliminate any damage which may be caused to the shafts.

Once a shaft has been damaged it is difficult to put right again without removing the shaft concerned, rebuilding it, and turning it down again.

If the bore of the pulley is oversize, it should be returned for a replacement. When refitting, ensure that the correct key is used in the case of keyway type pulleys and that the key is fitted correctly.

Badly fitting pulleys can create real vibration problems causing body cracks to the machine as well as the chutes.

Factor 8. Pulleys out of balance

Pulleys are normally balanced, but occasionally an unbalanced pulley may be fitted by mistake.

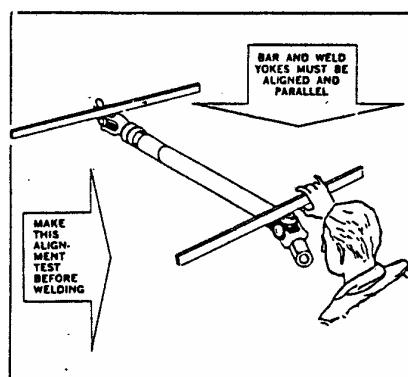
If changing pulley ratios fit only genuine Gallagher supplied pulleys.

Factor 9. Driveshaft out of balance

Occasionally when driveshafts are shortened or damaged, the repair is not always done correctly.

The crosses of the yokes at both ends of the assembled shaft must be in line with each other (see illustration).

Driveshafts can become accidentally bent, which can cause vibration also. Repair or replace if necessary.



Factor 10. Gearbox

On extremely rare occasions, a gearbox may need an overhaul. The cause is usually lack of oil caused by leaks either through faulty seals or gaskets. Breather vents must be kept open.

The Gallagher Forager gearbox is a rugged, well designed, heavy duty box which has a reputation for excellent service.

The final vee belt drive offers good protection against shock damage for many years.

Users should keep in mind that while the belts should be tight for working conditions, they should not be over-tight.

Over-tight belts are unnecessarily hard on bearings and they will not yield much in the event of heavy solid objects being hit accidentally during harvesting.

Loose belts however, will slip, get hot and wear fast.

The optimum is in between. With a maximum of 68kW's at the pto there should be no problems.

Overhauling the centrally mounted Forager gearbox

- Remove the belt guard.
- Remove the driveshaft.
- Check for end float.
- Drain the oil and examine the debris in the oil.
- Slacken off the belt tensioner.
- Remove the pulley from the pinion shaft.
- Remove the bolts securing the pinion tube to the gearbox.
- Remove the gearbox lid bolts.
- Draw the lid off.
- Remove the crownwheel assembly by pulling on the shaft and tapping the back of the gearbox lightly with a hammer if necessary to remove the bearing.
- Examine the teeth on the crownwheel and pinion for damage to the hard facing. If there is some damage evident and with the risk of debris fouling the bearings, remove the gearbox housing by releasing the mounting bolts.
- Remove the cover plate from the pinion tube and then the pinion tube from the end plate of the Forager.
- Dismantle the pinion tube assembly and thoroughly wash with kerosene.
- Replace any damaged or worn parts and reassemble in the reverse fashion.
- Use the correct number of gaskets under the gearbox lid to achieve the correct amount of end float and backlash.



Overhauling the Offset Forager Gearbox

- Remove the belt guard and driveshaft guard.
- Remove the driveshaft.
- Remove the belts and top pulley.
- Undo the two carriage bolts either side of the gearbox.
- Remove the belt adjustment bolt.
- Slide the gearbox toward the A frame and lift out. Place on a bench.
- Hold in a vice and remove the back cover which should be on the top.
- Remove from the vice and pour the oil out into a receptacle. Inspect the oil and the gearing.
- A visual inspection of the crownwheel and pinion should reveal the problem, if any.
- Replace the gearbox in the vice.
- If the pinion only is to be removed, undo the three bolts on the side cover.
- Pull on the pinion shaft. If difficult to remove, tap with a soft hammer immediately behind the bearing. It will then pop out.
- To remove the crownwheel, remove the pinion and shaft first. Undo the front three bolts.
- Remove gearbox from vice and place it with the open side down on the bench.
- Remove grub screw and crownwheel nut.
- Tap crownwheel shaft down with a soft hammer or use a press if tight.
- Remove the bearings.
- Wash the gearbox housing thoroughly in a kerosene bath.
- Determine which parts need to be replaced.
- Re-assemble in the reverse order.

To remove the pinion

Undo the gearbox housing bolts and the end cover bolts.

Remove the end cover and gearbox housing.

Lift the tube assembly up and drop the pulley end of the pinion on a block of wood to dislodge the shaft.

Withdraw the pinion and shaft.

To remove the pinion bearings

Bend up tab on tab washer and remove the pinion shaft nut.

Remove the bearing on the pinion shaft.

Remove the bearing from the tube.

Remove the bearing cups from the gearbox lid and housing.

Wash the gearbox housing and tube thoroughly in a kerosene bath.

Determine which parts need to be replaced.

Re-assemble in the reverse order.

To reset the backlash

There should be .2 of a millimetre backlash between the pinion and crownwheel teeth.

If too much, remove the pinion and crownwheel in that order. Remove the bearings off crownwheel shaft and fit a shim of the required thickness against the back of the crownwheel and reassemble.

Shims should be made on the job with usual workshop shim material.

Blue the teeth on the crownwheel and pinion.

Reassemble and check for heeling or toeing by turning the pinion shaft.

Study the wear pattern.

If heeling, remove the pinion and then its bearing.

Machine off the required amount of bearing shoulder and face off the same amount of shaft.

If toeing, remove the pinion and its bearing and shim between these to the required amount.

Re-assemble and check backlash. Backlash should be right if the former procedures have been accurate.

Fitting the Driveshaft

IMPORTANT

Before this machine is ready for use, the driveshaft must be checked for length and if necessary, cut to suit the tractor being used.

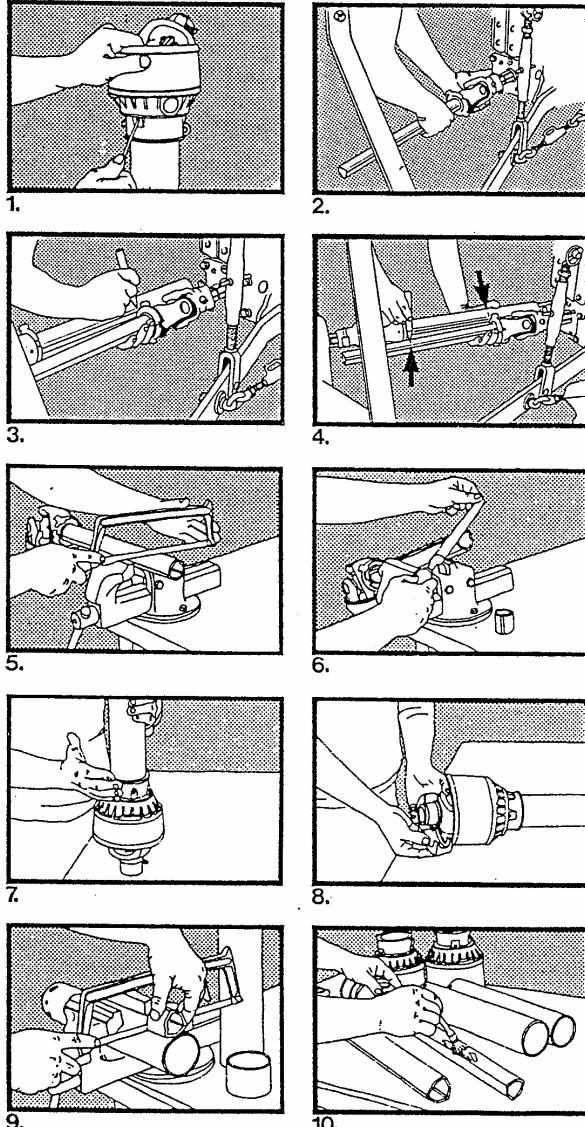
- 1) Check for length
 - a) Mount the machine on the tractor three point linkage system.
 - b) Lift the hydraulics until the input shaft on the machines gearbox is level with the power take off (PTO) shaft on the tractor.
 - c) With the driveshaft in its shortest telescoped length, hold it horizontally beside the tractor PTO and the machines input shaft.
 - d) If the shaft is obviously too long, or if bottoming is likely to occur, follow these instructions.

- 2) Remove the safety guard system
 - a) Keep cone pressed downwards and release catches with a screwdriver as in illustration (1).
 - b) With the guards stripped, fit the tractor end of the driveshaft approximately 10-15mm onto the PTO shaft, only as shown in illustration (2).
 - c) Fit the implement end of the driveshaft with the safety clutch (if fitted) onto the machine input shaft until the quick release mechanism snaps into the locating groove.
 - d) Lift both telescopic shaft tubes until they are level and parallel to each other.
 - e) Mark each tube opposite the base of the opposing yokes as in illustration (3) and (4).

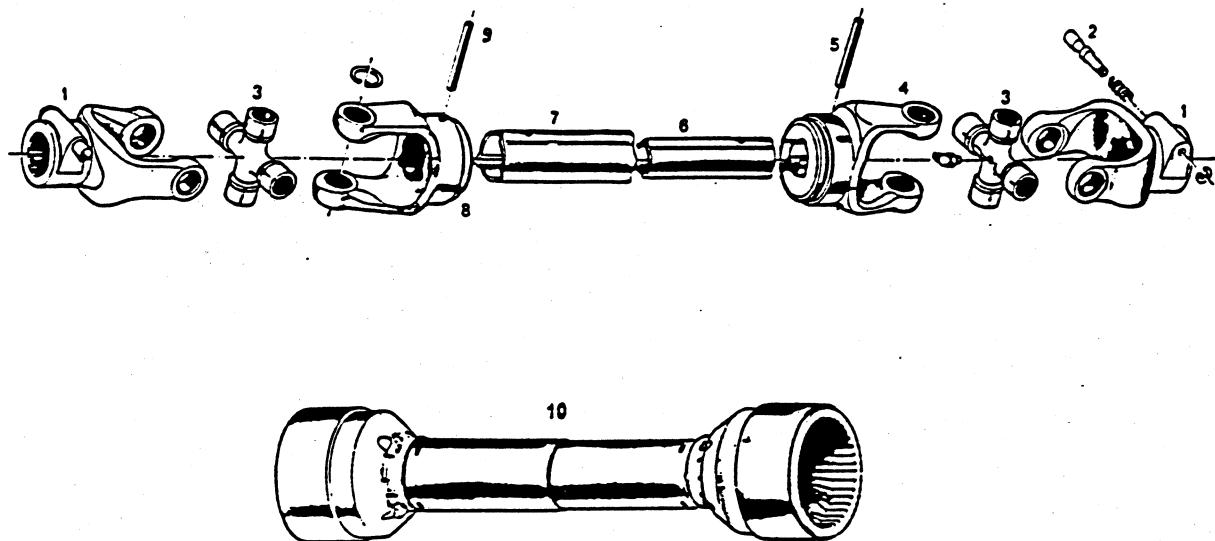
- 3) Cutting the driveshaft to length
 - a) Remove the driveshaft ends from the tractor and the machine.
 - b) Place the tube in a vice and hacksaw the surplus tube off each section at the marks made in step (2)b making a good square cut. See illustration (5).
 - c) Deburr tube ends and remove filings as in illustration (6).

- 4) Replacing the safety guards
 - a) Before assembling, cut off the surplus guard tube by using the surplus drive tube off cuts as a gauge. See illustrations (7-9).

- 5) Fitting the driveshaft
 - a) Start the tractor and lift the machine on the hydraulics. Fit the machine end first and then the tractor end. Make sure that the quick release mechanism is correctly located at both ends.
 - b) Lower the machine and double check that the driveshaft does not 'bottom' when the driveshaft is compressed to its shortest length.

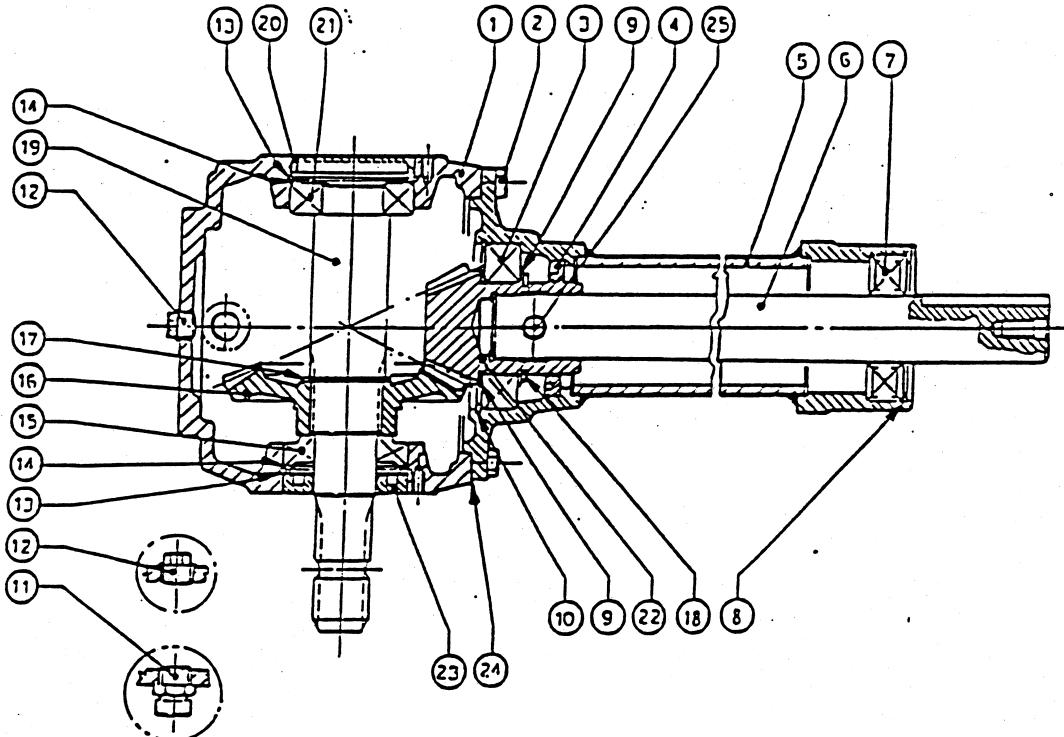


Drive Shaft



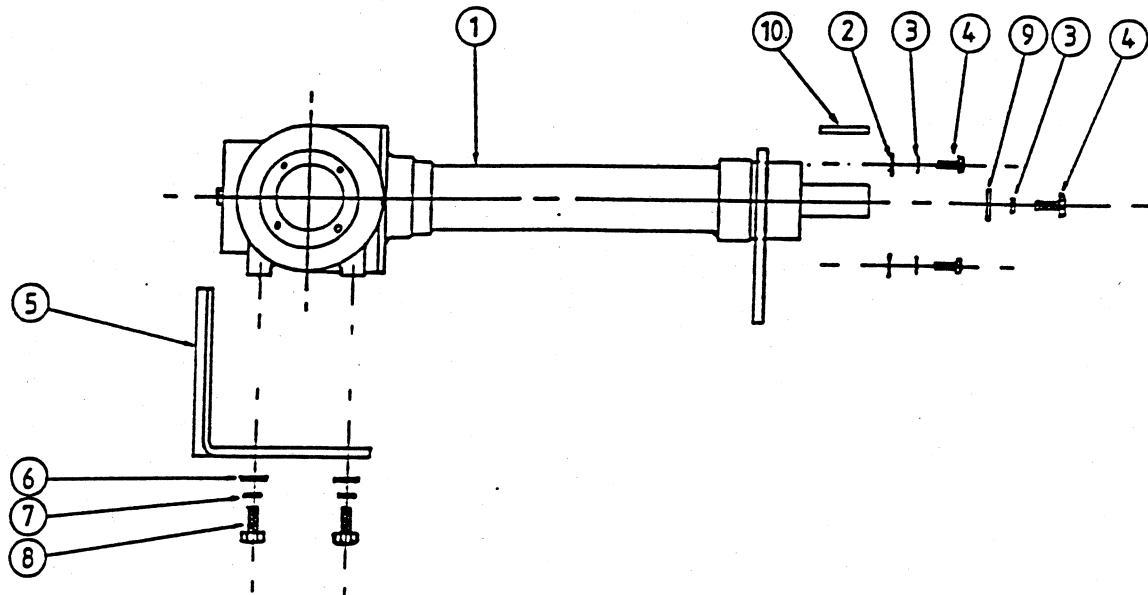
Item	Part Number	Description	Quantity	Remarks
-	823022	Drive shaft	1	T70 Series
1	824100	Yike	2	1-3/8" 6 Spline
2	824102	Push pin set	2	1-3/8"
3	824103	Cross journal set	2	
4	824107	Inner tube yoke	1	
5	836020	Roll pin	1	10 x 70
6	824105	Inner tube	1	L=700
7	824106	Outer tube	1	L=700
8	824107	Outer tube yoke	1	
9	836015	Roll pin	1	10 x 75
10	824099	Safety shield set	1	P type

Central Mount Gearbox



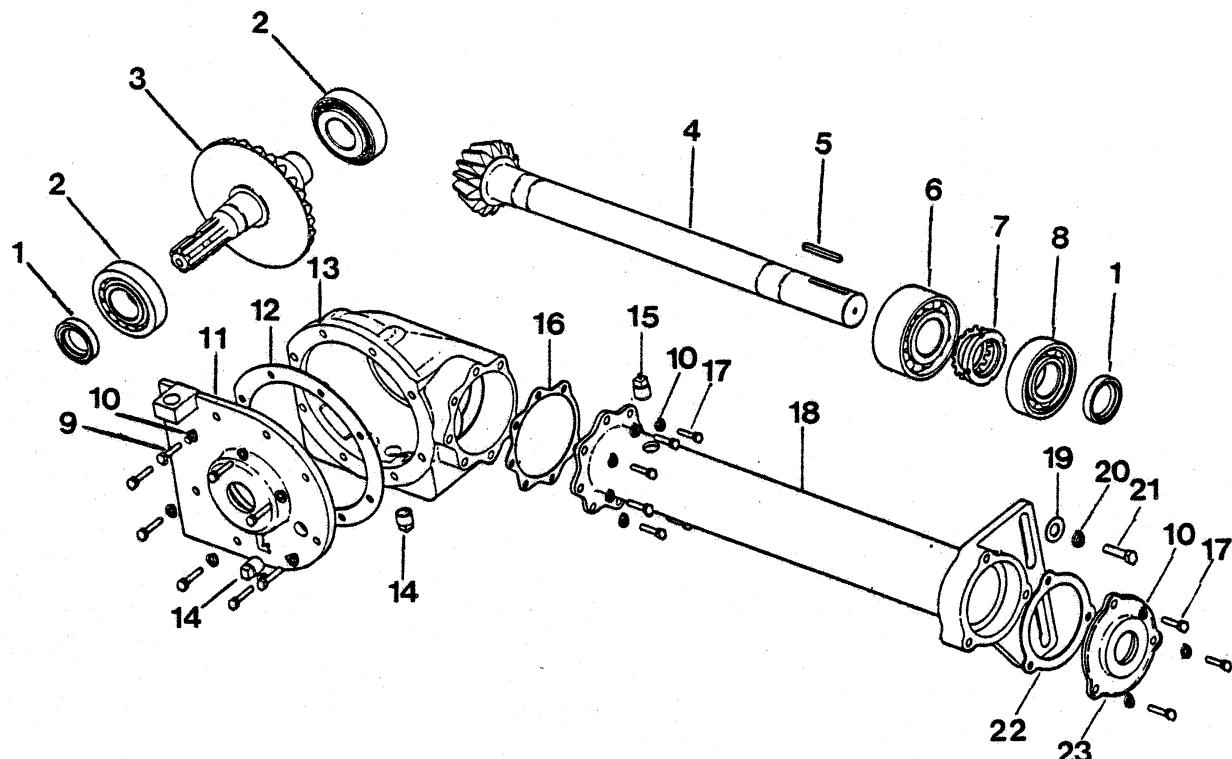
Item	Part Number	Description	Quantity	Remarks
	108174	Gearbox Complete	1	1.35m
	108175	Gearbox Complete	1	1.85m
1	822043	Gearbox Housing	1	
2	832302	Bolt	8	M10 x 25 HT
3	811063	Bearing	1	6211
4	813030	Oil Seal	1	55 x 80 x 10
5	822046	Extension Tube	1	1.35m
	822048	Extension Tube	1	1.85m
6	822047	Shaft	1	1.35m
	822049	Shaft	1	1.85m
7	811064	Bearing	1	6308 2RS
8	817023	Snap Ring	1	90 UNI 7437
9	849012	Shim	2	67-7
10	817025	Snap Ring	1	100 UNI 7437
11	830020	Plug Oil Filter	1	3/8" Gas
12	830009	Plug	2	3/8" Gas
13	817024	Snap Ring	2	80 UNI 7437
14	849013	Shim	2	79-7
15	811057	Bearing	1	30208
16	822050	Crown Wheel Z28	1	M5.47
17	817025	Snap Ring	1	46 UNI 743
18	817026	Snap Ring	1	55 UNI 7435
19	822051	Shaft	1	1 3/8" 6 spline
20	822052	Cap	1	80 x 10
21	811016	Bearing	1	6208
22	822053	Pinion Z12	1	M5.47
23	813031	Oil Seal	1	40 x 80 x 10
24	718028	Gasket	1	
25	836023	Pin	1	14 x 55

Gearbox Mounting



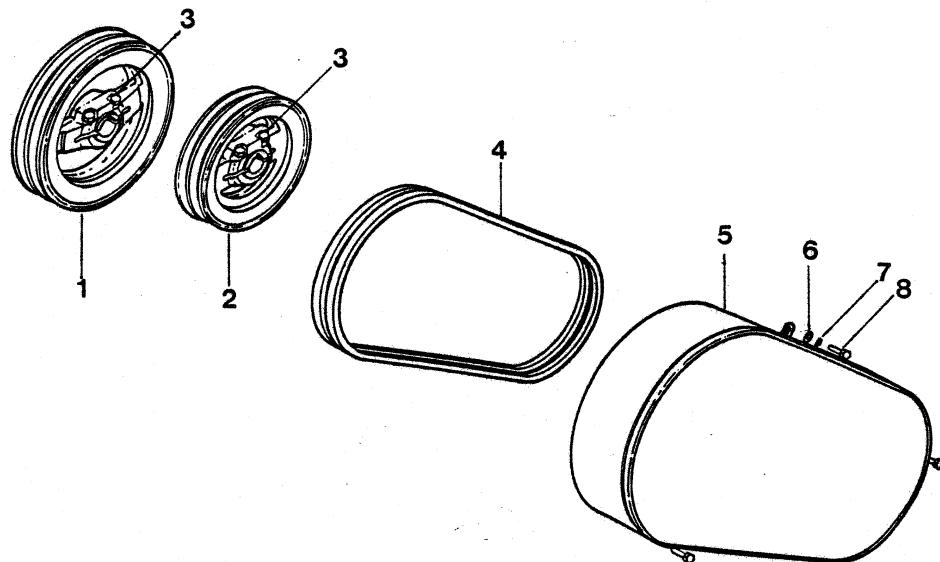
Item	Part Number	Description	Quantity	Remarks
1	108174	Gearbox	1	1.35m
1	108175	Gearbox	1	1.85m
2	835006	Washer	2	M12
3	835104	Spring washer	3	M12
4	823404	Bolt	3	M12x30
5	108178	Gearbox mounting bracket	1	
6	835008	Washer	4	M16
7	835106	Spring washer	4	M16
8	832522	Bolt	4	M16x35
9	108176	Washer	1	
10	108177	Key	1	12 x 8 x 75

Central Mount Gearbox



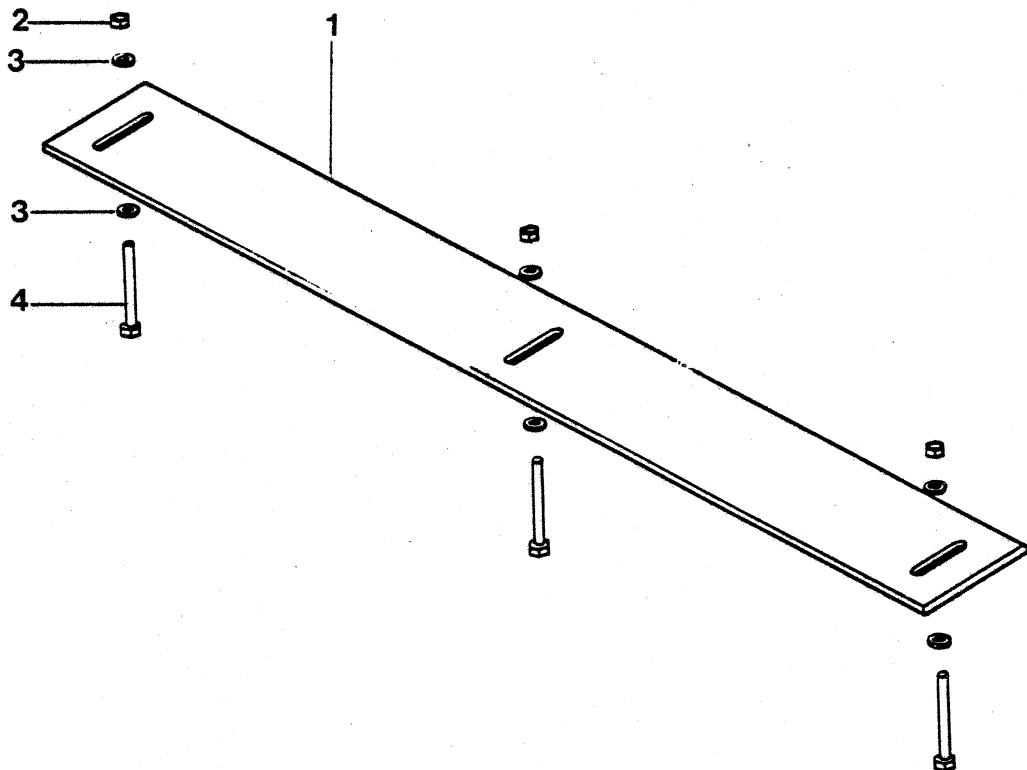
Item	Part Number	Description	Quantity	Remarks
	H652	Gearbox/Tube Complete	1	1.35m
	H653	Gearbox/Tube Complete	1	1.85m
1	H92	Oil Seal	2	250 124 N12 M1
2	R94F	Taper Roller Bearing	2	30309
3	H654	Crownwheel / Shaft	1	
4	H275	Pinion / Shaft	1	1.35m
	H276	Pinion / Shaft	1	1.85m
5	H295	Key	1	10 x 10 x 63.2
6	H181	Angular Ball Bearing	1	3310
7	H185	Nut	1	KM10
	H186	Tab Washer	1	MB10
8	H184	Ball Bearing	1	6309
9	8BM1030	Bolt	8	M10 x 30
10	8WS10	Spring Washer	18	M10
11	H177	Gearbox Lid	1	Casting
12	H169	Gasket – Gearbox Lid	1	0.4mm Flexiod
	H170	Gasket – Gearbox Lid	1	0.8mm Flexiod
13	H176	Gearbox Housing	1	Casting
14	9PS12	Plug	2	½" BSP
15	R89	Breather Plug	1	½" BSP
16	H171	Gasket – Gearbox/Tube	1	0.4mm Flexiod
	H172	Gasket – Gearbox/Tube	1	0.8mm Flexiod
17	8BM1025	Bolt	10	M10 x 25
18	H285	Tube	1	1.35m
	H286	Tube	1	1.85m
19	8WH12	Flat Washer	2	M12
20	8WS12	Spring Washer	2	M12
21	8BM1230	Bolt	2	M12 x 30
22	R161	Gasket – Output Shaft Cover	1	1.35m
	R162	Gasket – Output Shaft Cover	1	1.85m
23	H84F	Cover Plate	1	Output shaft

Central Mount Belt Drive



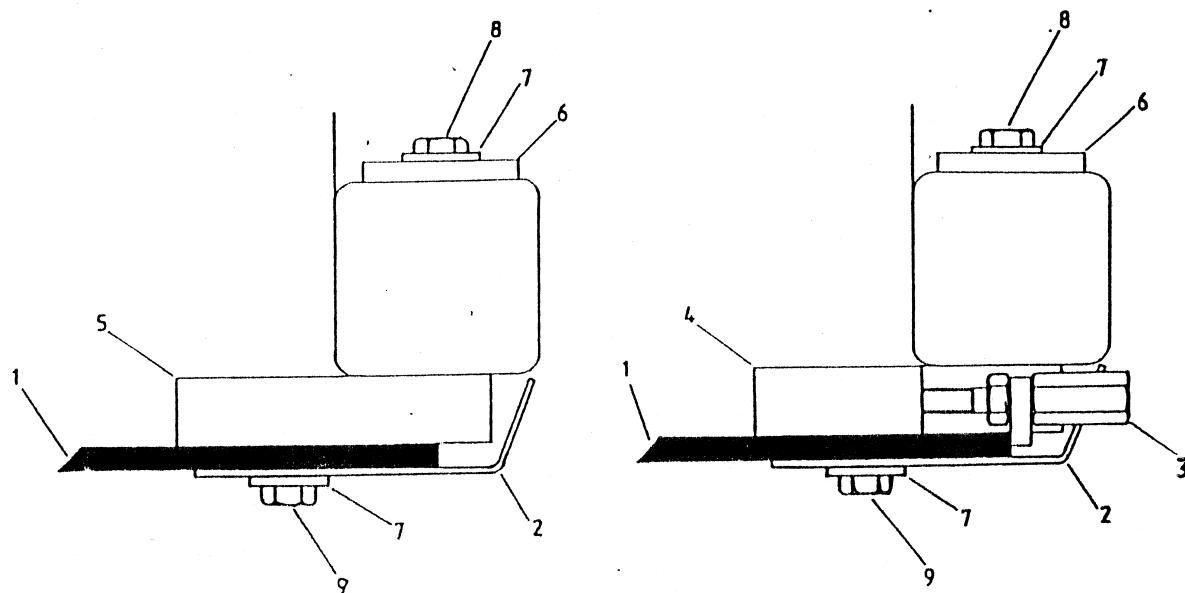
Item	Part Number	Description	Quantity	Remarks
1	828006	Pulley Ø 230-2C		Top Pulley
	108166	Pulley Ø 260-2C		Top Pulley
	108167	Pulley Ø 300-2C		Top Pulley (std)
	108168	Pulley Ø 325-2C		Top Pulley
	108169	Pulley Ø 350-2C		Top Pulley
	828007	Pulley Ø 230-3C		Top Pulley
	108170	Pulley Ø 260-3C		Top Pulley
	108171	Pulley Ø 300-3C		Top Pulley (std)
	108172	Pulley Ø 325-3C		Top Pulley
	108173	Pulley Ø 350-3C		Top Pulley
2	828004	Pulley Ø 230-2C		Bottom Pulley
	108032	Pulley Ø 260-2C		Bottom Pulley (std)
	108033	Pulley Ø 300-2C		Bottom Pulley
	108034	Pulley Ø 325-2C		Bottom Pulley
	828005	Pulley Ø 230-3C		Bottom Pulley
	108037	Pulley Ø 260-3C		Bottom Pulley (std)
	108038	Pulley Ø 300-3C		Bottom Pulley
	108039	Pulley Ø 325-3C		Bottom Pulley
3	832527	Bolt	4	M16 x 100
	834007	Nyloc Nut	4	M16
4	844005	V Belt C61		
	844006	V Belt C62		
	844007	V Belt C63		
	844008	V Belt C64		
	844009	V Belt C65		
	844010	V Belt C66		
	844011	V Belt C67		Standard
	844012	V Belt C68		
	844013	V Belt C69		
	844014	V Belt C70		
	844015	V Belt C71		
	844016	V Belt C72		
	844021	V Belt C73		
	844022	V Belt C74		
	844023	V Belt C75		
5	108048	Pulley Guard	1	
6	835006	Washer	3	M12
7	835104	Spring Washer	3	M12
8	832404	Bolt	3	M12 x 30

Fine Cut Bar



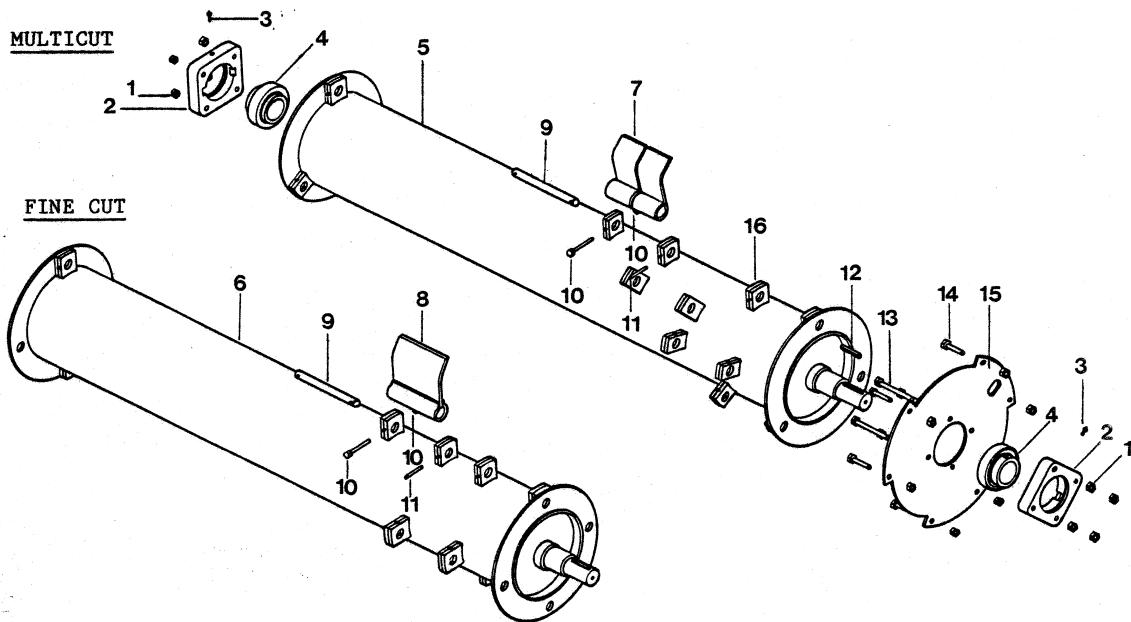
Item	Part Number	Description	Quantity	Remarks
1	108062	Fine Cut Bar 1.05	1	10 x 170 x 1080
	108063	Fine Cut Bar 1.35	1	10 x 170 x 1360
	108064	Fine Cut Bar 1.85	1	10 x 170 x 1800
2	834006	Nyloc Nut	3	M12
3	835006	Washer	6	M12
4	832416	Bolt	3	M12 x 120

Adjustable Fine Cut Bar



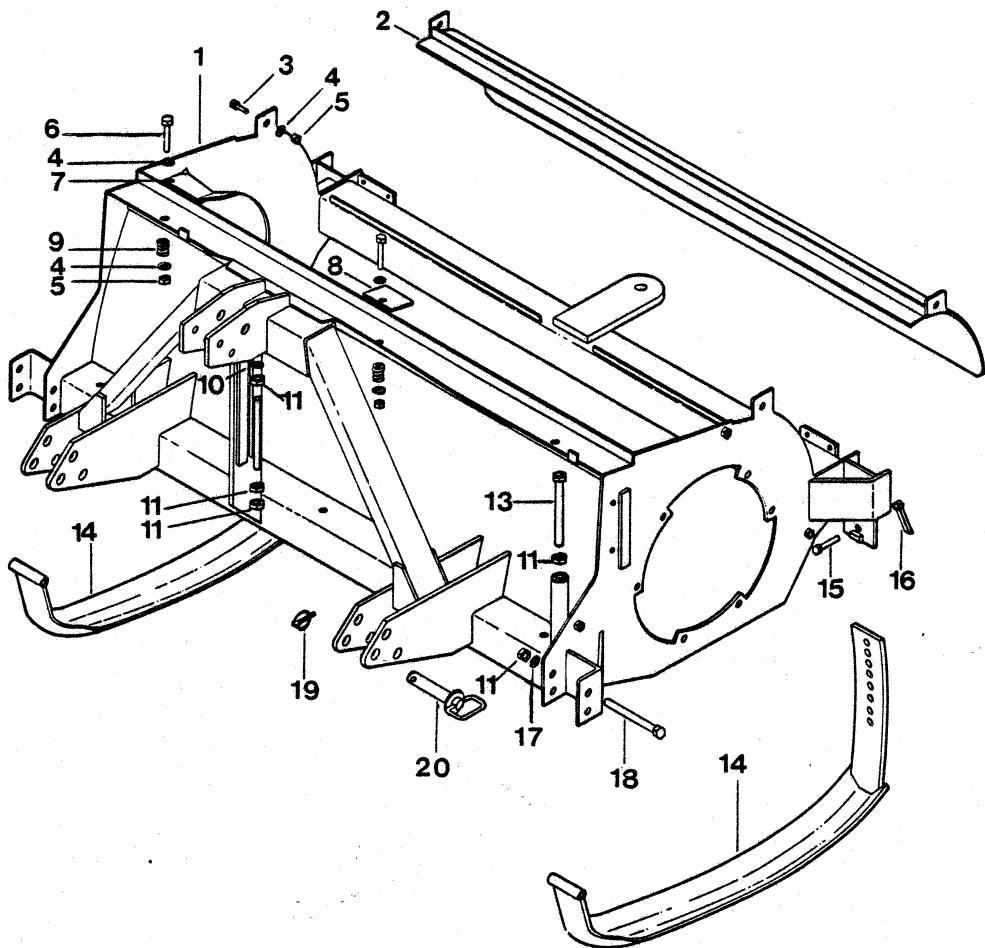
Item	Part Number	Description	Quantity	Remarks
1	108066	Adjustable Fine Cut Bar	1	1.05m
	108067	Adjustable Fine Cut Bar	1	1.35m
	108068	Adjustable Fine Cut Bar	1	1.85m
2	108069	Cover Plate	1	1.05m
	108070	Cover Plate	1	1.35m
	108071	Cover Plate	1	1.85m
3	108074	Adjusting Screw	2	
4	108072	Adjusting Block	2	
5	108073	Spacing Block	1	
6	108065	Support Plate	3	
7	835104	Spring Washer	6	M12
8	832432	Bolt	3	M12 x 130
9	832425	Bolt	3	M12 x 45

Central Mount Rotor



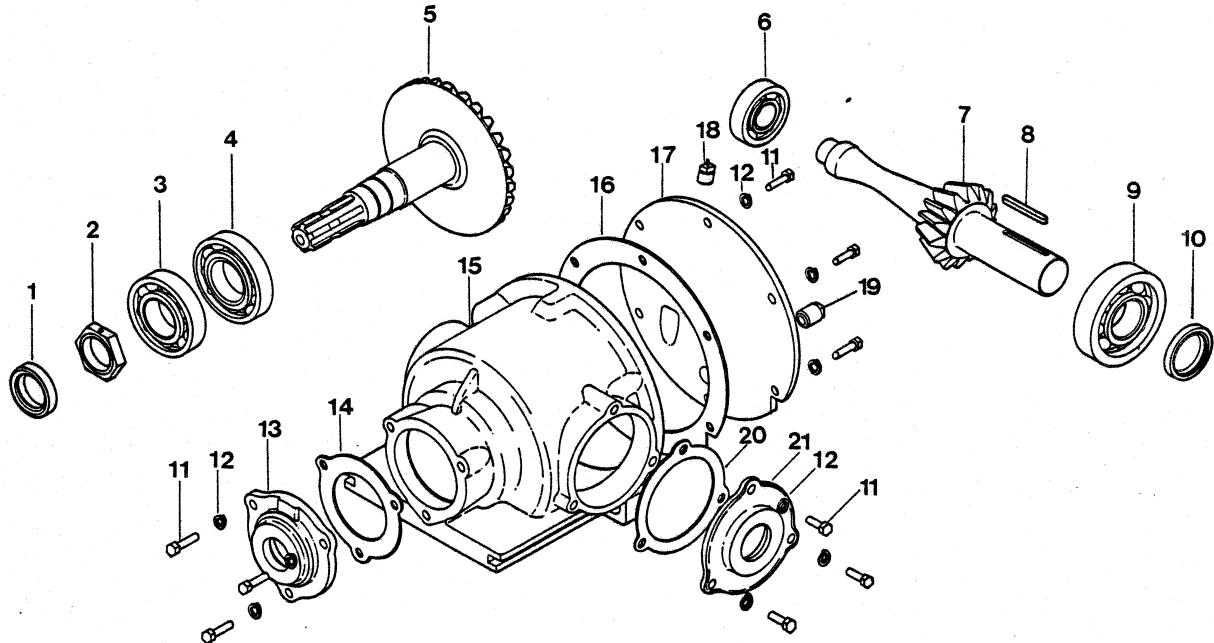
Item	Part Number	Description	Quantity	Remarks
1	834007	Nyloc Nut	14	M16
2	812006	Bearing Housing	2	FX1136
3	818001	Grease Nipple	2	1/4" UNF
4	811056	Ball Bearing	2	UC211-D1
	819013	Grub Screw	2	
5	108017	Rotor	1	1.35m (4' 6") MC
	108018	Rotor	1	1.85m (6' 0") MC
6	108015	Rotor	1	1.35m (4' 6") FC
	108016	Rotor	1	1.85m (6' 0") FC
7	714001	Spring Steel Flail	60	1.35m (4' 6") MC
			78	1.85m (6' 0") MC
8	108058	Standard Flail	20	1.35m (4' 6") FC
			26	1.85m (6' 0") FC
9	108061	Flail Pin	30	1.35m (4' 6") MC
			39	1.85m (6' 0") MC
			20	1.35m (4' 6") FC
			26	1.85m (6' 0") FC
10	823106	Bolt M6 x 60 Grade 8.8	30	1.35m (4' 6") MC
			39	1.85m (6' 0") MC
			20	1.35m (4' 6") FC
			26	1.85m (6' 0") FC
11	836001	Roll Pin 1/4" x 2"	30	1.35m (4' 6") MC
			39	1.85m (6' 0") MC
			20	1.35m (4' 6") FC
			26	1.85m (6' 0") FC
12	108031	Key	1	10 x 10 x 64
13	832516	Bolt	4	M16 x 60
14	832525	Bolt	6	M16 x 45
15	108042	Bearing Plate	1	
16	108019	Rotor Lug		
17	834003	Nyloc Nut	30	1.35m (4' 6") MC
			39	1.85m (6' 0") MC
			20	1.35m (4' 6") FC
			26	1.85m (6' 0") FC

Central Mount Body



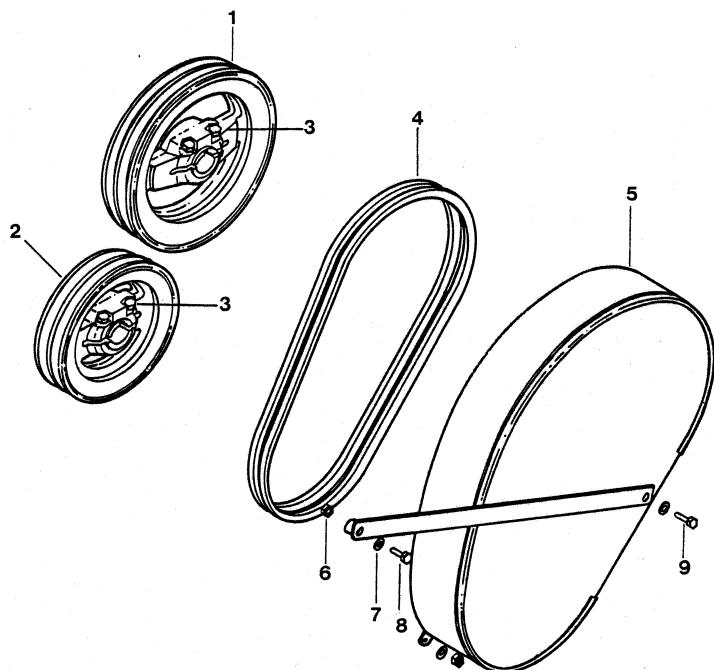
Item	Part Number	Description	Quantity	Remarks
1	108005	Body 1.35	1	
	108006	Body 1.85	1	
2	108046	Removable Back 1.35	1	
	108047	Removable Back 1.85	1	
3	832526	Bolt	2	M16 x 50
4	835006	Washer	8	M12
5	834006	Nyloc Nut	5	M12
6	832408	Bolt	3	M12 x 40
7	835008	Washer	4	M16
8	108084	Chute Clamping Plate	3	
9	834007	Nyloc Nut	2	M16
10	835010	Washer	2	M20
11	834020	Nut	7	M20
12	108012	Adjustment Screw	1	M20 x 180
13	108007	Adjuster Jack	1	M20 x 180
14	108049	Skid	2	
15	823601	Bolt	2	M20 x 45
16	108050	Skid Nut	2	
17	835108	Spring Washer	3	M20
18	832607	Bolt	2	M20 x 140
19	839002	Lynch Pin	2	M10
20	838002	Hitch Pin – Cat II	2	AG220

Offset Gearbox



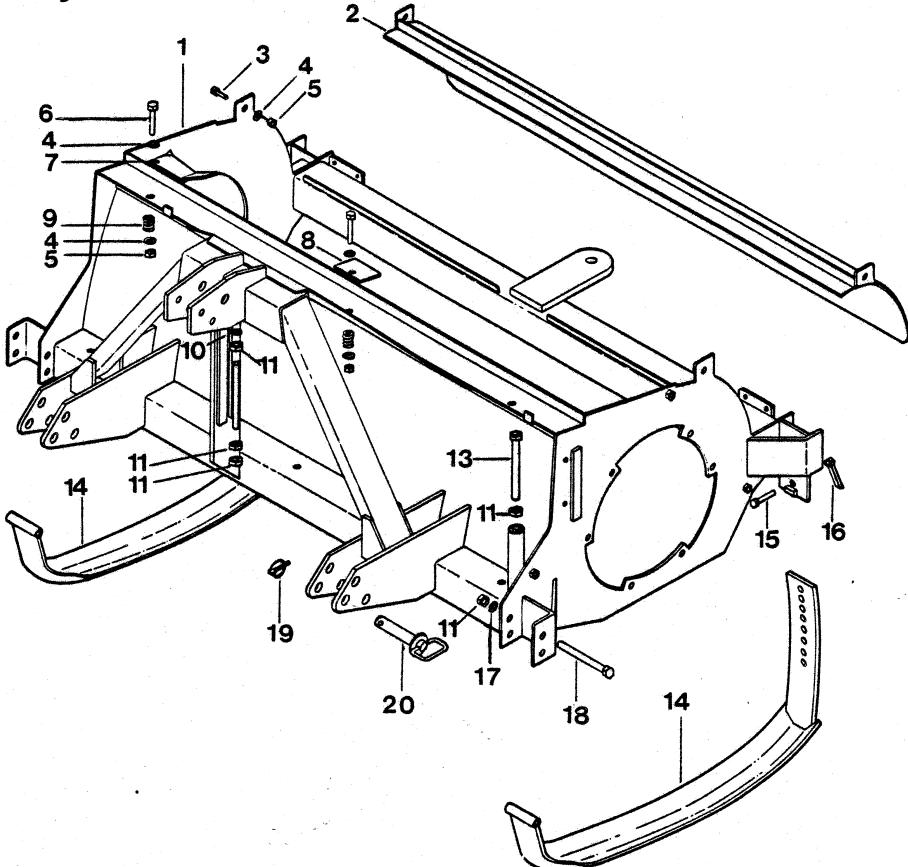
Item	Part Number	Description	Quantity	Remarks
	H100	Gearbox Complete	1	
1	H87	Oil Seal	1	225 116 N12 M1
2	H89	Crown Wheel Nut	1	1 1/4" BSP
3	H90	Ball Bearing	1	RLS14
4	D87	Ball Bearing	1	RLS16
5	H192	Crown Wheel Shaft	1	
6	H86F	Ball Bearing	1	RMS9
7	H81F	Pinion Shaft	1	
8	H295	Key	1	10 x 10 x 63.5
9	H93	Ball Bearing	1	RMS14
10	H92	Oil Seal	1	250 124 N12 M1
11	8BM1025	Bolt	12	M10 x 25
12	8WS10	Spring Washer	12	M10
13	H85F	Cover Plate	1	Cast Aluminium
14	L83	Gasket – Input Shaft Cover	1	0.4mm Flexoid Opt.
	R161	Gasket – Input Shaft Cover	1	0.4mm Flexoid Opt.
	R162	Gasket – Input Shaft Cover	1	0.8mm Flexoid Opt.
15	H80F	Gearbox Housing	1	Casting
16	H165	Gasket – Gearbox Lid	1	2.4mm Cork
17	H94F	Gearbox Lid	1	Casting
18	R89	Breather Plug	1	1/2" BSP
19	9PS12	Plug	1	1/2" BSP
20	H166	Gasket – Output Shaft Cover	1	2.4mm Cork
21	H84F	Gearbox Cover	1	Casting

Offset Belt Drive



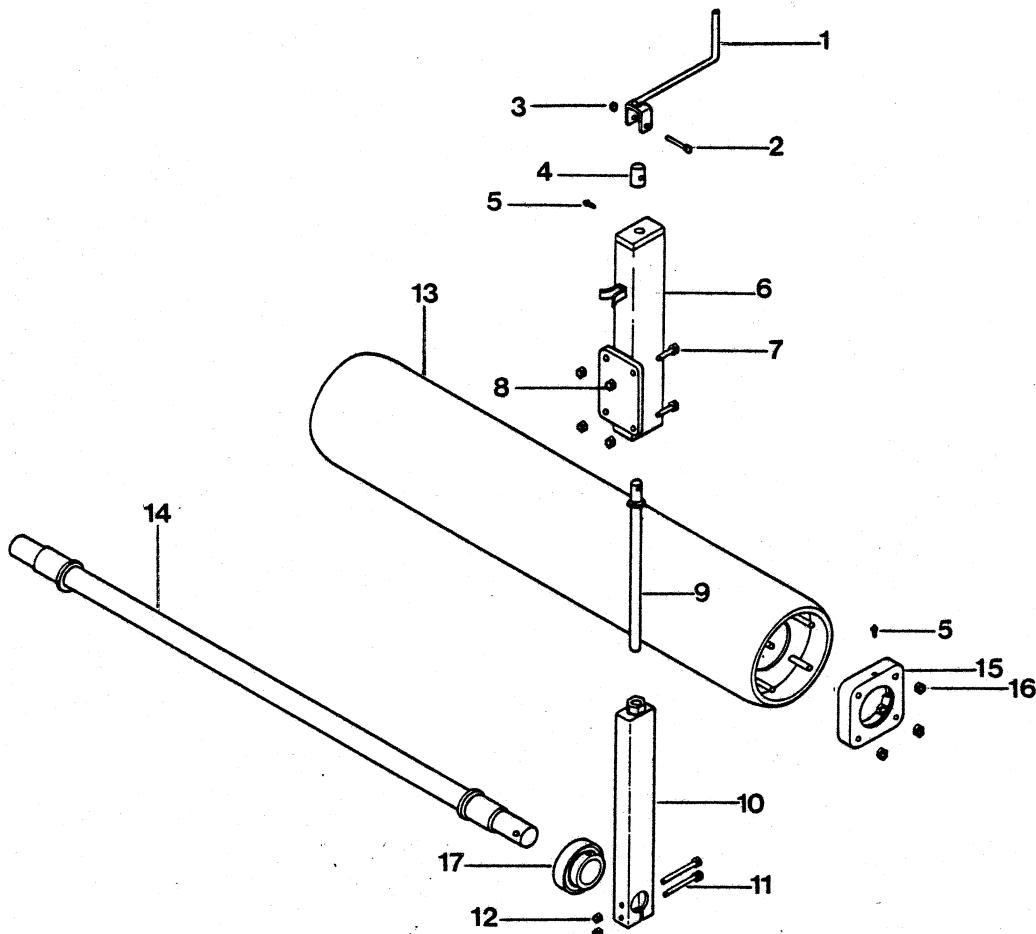
Item	Part Number	Description	Quantity	Remarks
1, 2	H60	Pulley 2C - 9"		Optional
	H61	Pulley 2C - 10 1/4"		Standard Bottom Pulley
	H62	Pulley 2C - 11 3/4"		Optional
	H63	Pulley 2C - 12 3/4"		Optional
	H64	Pulley 2C - 13 3/4"		Standard Top Pulley
	H74	Pulley 3C - 9"		Optional
	H75	Pulley 3C - 10 1/4"		Optional
	H76	Pulley 3C - 11 3/4"		Optional
	H77	Pulley 3C - 12 3/4"		Optional
	H78	Pulley 3C - 13 3/4"		Optional
3	8BM16100	Bolt	4	
	8NY16	Nyloc Nut	4	
4	H298	V Belt C57		
	H299	V Belt C58		
	H300	V Belt C60		
	H301	V Belt C61		
	H302	V Belt C62		
	H303	V Belt C63		
	H304	V Belt C64		
	H305	V Belt C65		
	H306	V Belt C66		
	H307	V Belt C67		
5	H328	Pulley Guard	1	
6	8NY12	Nyloc Nut	3	
7	8WH12	Flat Washer	3	
8	8BM1250	Bolt	1	
9	8BM1230	Bolt	1	

Offset Body



Item	Part Number	Description	Quantity	Remarks
1	H204	Body Welded Assembly Only	1	1.05m
	H205	Body Welded Assembly Only	1	1.35m
2	H122	Removable Back	1	1.05m
	H123	Removable Back	1	1.35m
3	8BM1250	Bolt	2	M12 x 50
4	8WH12	Flat Washer	9	M12
5	8NY12	Nyloc Nut	5	M12
6	8BM1275	Bolt	2	M12 x 75
7	H396	Chute Clip	2	
8	H45F	Spring	2	
9	H38F	Gearbox Adjuster Bolt	1	M20 x 180
10	8SP320	Split Pin	1	M3 x 20
11	8WS12	Spring Washer	2	M12
12	H39F	Clamping Bolt - Short	1	M12 x 280
13	H319	Clamping Bolt - Long	1	M12 x 325
14	H66	Skid	2	
15	8BM2045	Bolt (not shown)	2	M20 x 45
16	H67	Skid Nut	2	M20
17	8NP20	Nut	2	M20
18	8WS20	Spring Washer	3	M20
19	H68	Bolt	2	M20 x 140
20	H84F	Gearbox Cover	1	
21	8BM1025	Bolt	1	M10 x 25
22	8WH10	Flat Washer	1	M10
23	8NY10	Nyloc Nut	1	M10
24	R35	Lynch Pin	2	M10
25	R476	Double Hitch Pin - Cat I & II	2	1-1/8" x 190

Bolt-On Roller



	Part Number	Description	Quantity	Remarks
1	102014	Screw Handle	2	
2	832208	Bolt	2	M8 x 60
3	834004	Nyloc Nut	2	M8
4	102015	Screw Knob	2	34mm
5	818001	Grease Nipple	2	1/4" UNF
6	108001	Roller Arm Outer Assembly	2	
7	832431	Bolt	8	M12 x 35 HT
8	834006	Nyloc Nut	8	M12
9	108057	Roller Screw	2	M24 x 380
10	108004	Roller Arm Inner Assembly	2	
11	832310	Bolt	3	M10 x 80
12	834005	Nyloc Nut	3	M10
13	108104	Roller 1.05	1	
	108105	Roller 1.35	1	
	108106	Roller 1.85	1	
14	108163	Roller Axle 1.05	1	
	108164	Roller Axle 1.35	1	
	108165	Roller Axle 1.85	1	
15	812006	Bearing Housing	2	FX1136
16	834007	Nyloc Nut	8	M16
17	811056	Ball Bearing	2	UC211-01
18	818003	Grease Nipple	2	1/4" UNF 90deg